BRIEFER ARTICLES

VARIATION IN HELIANTHUS

In a recent number of this journal, Dr. GEORGE H. SHULL[1] calls attention to the dark disk found in the wild sunflower of the prairie region, but shows that certain material received from that region was heterozygous with a yellow disk recessive. It may be worth while to report that this wild plant does actually produce a yellow-disked variety, which I have observed both in Colorado and New Mexico. The western sunflower, according to RYDBERG, is separable as a distinct species, *Helianthus lenticularis* Dougl. This seems to be going too far, and I think it should be called *H. annuus lenticularis*. The color of the disk is considered a specific character in Helianthus; but it certainly varies within specific limits, not only in *H. annuus*, but in *H. petiolaris* also, as I have shown in *Nature*, June 19, 1902, p. 174.—T. D. A. COCKERELL, *Boulder, Colorado.*

ENDOSPERM OF PONTEDERIACEAE

(WITH FOUR FIGURES)

In a recent paper[2] on the seeds of Pontederiaceae, COKER makes some references to my paper published in 1898,[3] to which I wish to make a brief reply. He says: "Oddly enough he completely overlooked the interesting peculiarity in the endosperm of all three genera." The reason for my overlooking such a peculiarity is clear enough, as a very casual reading of the paper will show that I made no attempt to follow endosperm formation. My study was based chiefly on Eichhornia, and in that genus, as grown in Washington Park, Chicago, the endosperm nucleus almost never divides, and the contents of the embryo sac disorganize without development of endosperm or embryo.

Some of my slides of Pontederia, however, extend beyond the fertilization stage, and since COKER'S article appeared I have reexamined these, and am able in three cases to confirm his account of a division of the embryo sac into upper and lower chambers. *Fig. 3* shows the condition of the

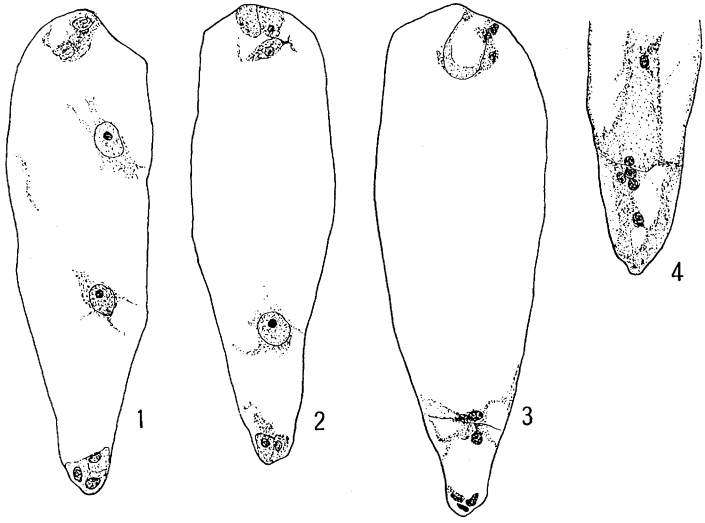
[1] Some new cases of Mendelian inheritance. BOT. GAZETTE 45:103–116. 1908.

[2] COKER, W. C., The development of the seed in the Pontederiaceae. BOT. GAZETTE 44:293–301. *pl. 23.* 1907.

[3] SMITH, W. R., A contribution to the life history of the Pontederiaceae. BOT. GAZETTE 25:324–337. *pls. 19, 20.* 1898.

embryo sac just after the division of the endosperm nucleus, and *fig. 4* the lower end of the sac a short time later, with several nuclei in the lower chamber. Of later conditions of the endosperm my slides do not furnish examples.

Again COKER says: "The antipodals never divide, but they are not ephemeral as described by SMITH." There may be some difference of opinion as to what degree of persistence my description implies, but after a reexamination of my slides, and even from COKER'S own figures, I am still convinced of its correctness. COKER makes the error of regarding the antipodals as a group of nuclei; he cites the persistence of such nuclei after



the initiation of endosperm formation as a disproof of my statement; but the antipodals are cells, not nuclei. In those embryo sacs in which they are recognized as typically persistent, such as numerous Ranunculaceae, Sparganium, and others, they become a conspicuous mass of cells; they do not persist as free nuclei. In the case of Eichhornia and Pontederia they are organized cells at the stage shown in *figs. 1* and *2* herewith, and in *fig. 13* of COKER'S plate. These cells disorganize immediately after the fusion of the polar nuclei, sometimes even earlier, a behavior which amply justifies my describing them as ephemeral. In later stages of the embryo sac only the nuclei can be distinguished, and these in a partially disorganized condition, as in *figs. 3* and *4*. Compare also COKER'S *figs. 13, 15, 17*, in which the disintegration of the antipodal cells and the absorption of their nuclei may be clearly traced.—R. WILSON SMITH, *McMaster University, Toronto, Canada.*